AMENDMENTS TO THE CLAIMS:

This listing of the claims will replace all prior versions, and listings, of claims in the application.

Listing of Claims:

Claims1 - 18 (Canceled).

19. (Currently Amended) A method of performing an echo phase offset correction in a multi-carrier demodulation system, comprising the steps of:

differential phase decoding phase shifts based on a phase difference between simultaneous carriers having different frequencies;

determining an echo phase offset for each decoded phase shift by eliminating phase shift uncertainties related to the transmitted information from said decoded phase shift;

averaging said echo phase offsets in order to generate an averaged offset; [[and]]

correcting each decoded phase shift based on said averaged offset; and

further comprising a step of comparing an absolute value of a symbol associated with a respective decoded phase shift with a threshold, wherein only phase shifts having associated therewith symbols having an absolute value exceeding said threshold are used in said step of averaging said echo phase offsets.

20. (Previously Presented) The method according to claim 19, wherein said step of differential phase decoding comprises the step of differential phase decoding

phase shifts based on a phase difference between simultaneous carriers which are adjacent in the frequency axis direction.

21. (Previously Presented) The method according to claim 19, wherein said step of differential phase decoding comprises the step of differential phase decoding phase shifts based on phase differences between at least three simultaneous carriers which are equally spaced in the frequency axis direction.

22. (Canceled)

23. (Previously Presented) A method of performing an echo phase offset correction in a multi-carrier demodulation system, comprising the steps of:

differential phase decoding phase shifts based on a phase difference between simultaneous carriers having different frequencies, said phase shifts defining signal points in a complex plane;

pre-rotating said signal points into the sector of said complex plane between -45° and +45°;

determining parameters a, b of a straight line approximating the location of said pre-rotated signal points in said complex plane;

determining a phase offset based on said parameters a, b; and

correcting each decoded phase shift based on said phase offset.

24. (Previously Presented) The method according to claim 23, wherein said simultaneous carriers are equally spaced in the frequency axis direction.

25. (Previously Presented) The method according to claim 23, wherein said step of determining said parameters a, b comprises a least squares method for selecting

those parameters which minimize the deviations of said pre-rotated signal points from said straight line.

26. (Previously Presented) The method according to claim 25, wherein said parameters a, b are determined as follows:

$$b = \frac{\sum_{i=1}^{K} (x_i - \overline{x}) \cdot y_i}{\sum_{i=1}^{K} (x_i - \overline{x})^2}, \quad a = \overline{y} - \overline{x} \cdot b$$

$$\overline{x} = \frac{1}{N} \sum_{i=1}^{K} x_i, \quad \overline{y} = \frac{1}{N} \sum_{i=1}^{K} y_i$$

wherein x and y designate the coordinates of the signal points in the complex plane,

i is an index from 1 to N, and

K is the number of signal points.

27. (Previously Presented) The method according to claim 26, wherein said phase offset φ_k is determined as follows:

$$\varphi_k = \begin{cases} -\operatorname{a\,tan}\left(\dfrac{a + b\sqrt{|v_k|^2 (1 + b^2) - a^2}}{-ab + \sqrt{|v_k|^2 (1 + b^2) - a^2}} \right) & \text{for} \quad |v_k|^2 \geq \dfrac{a^2}{1 + b^2} \\ \operatorname{a\,tan}\left(\dfrac{1}{b} \right) & \text{for} \quad |v_k|^2 < \dfrac{a^2}{1 + b^2} \end{cases}$$

wherein v_k is a given decision variable.

28. (Currently Amended) An echo phase offset correction device for a multi-carrier demodulation system, comprising:

a differential phase decoder for decoding phase shifts based on a phase difference between simultaneous carriers having different frequencies;

means for determining an echo phase offset for each decoded phase shift comprising means for eliminating phase shift uncertainties related to the transmitted information from said decoded phase shift;

means for averaging said echo phase offsets in order to generate an averaged offset; [[and]]

means for correcting each decoded phase shift based on said averaged offset; and

means for comparing an absolute value of a symbol associated with a respective decoded phase shift with a threshold, wherein said means for averaging said phase offsets only uses phase shifts having associated therewith symbols having an absolute value exceeding said threshold.

29. (Previously Presented) The device according to claim 28, wherein said differential phase decoder is adapted for decoding said phase shifts based on a phase difference between simultaneous carriers which are adjacent in the frequency axis direction.

30. (Canceled)

31. (Previously Presented) The device according to claim 28, wherein said differential phase decoder is adapted for decoding said phase shifts based on

phase differences between at least three simultaneous carriers which are equally spaced in the frequency axis direction.

32. (Previously Presented) An echo phase offset correction device for a multi-carrier demodulation system, comprising:

a differential phase decoder for decoding phase shifts based on a phase difference between simultaneous carriers having different frequencies, said phase shifts defining signal points in a complex plane;

means for pre-rotating said signal points into the sector of said complex plane between -45° and +45°;

means for determining parameters a, b of a straight line approximating the location of said pre-rotated signal points in said complex plane;

means for determining a phase offset based on said parameters a, b; and

means for correcting each decoded phase shift based on said phase offset.

33. (Previously Presented) The device according to claim 32, wherein said differential phase decoder comprises means for decoding phase shifts of at least three simultaneous carriers which are equally spaced in the frequency axis direction.

34. (Previously Presented) The device according to claim 32, wherein said means for determining said parameters a, b comprises means for performing a least squares method for selecting those parameters which minimize the deviations of said pre-rotated signal points from said straight line.

35. (Previously Presented) The device according to claim 34, wherein said means for determining said parameters a, b calculates said parameters a, b as follows:

$$b = \frac{\sum_{i=1}^{K} (x_i - \overline{x}) \cdot y_i}{\sum_{i=1}^{K} (x_i - \overline{x})^2}, \quad a = \overline{y} - \overline{x} \cdot b$$

$$\overline{x} = \frac{1}{N} \sum_{i=1}^{K} x_i, \quad \overline{y} = \frac{1}{N} \sum_{i=1}^{K} y_i$$

wherein x and y designate the coordinates of the signal points in the complex plane,

i is an index from 1 to N, and

K is the number of signal points.

36. (Previously Presented) The device according to claim 35, wherein said means for determining said phase offset φ_k calculates said phase offset φ_k as follows:

$$\varphi_k = \begin{cases} -\operatorname{atan}\left(\dfrac{a + b\sqrt{|v_k|^2(1 + b^2) - a^2}}{-ab + \sqrt{|v_k|^2(1 + b^2) - a^2}}\right) & for \quad |v_k|^2 \geq \dfrac{a^2}{1 + b^2} \\ \operatorname{atan}\left(\dfrac{1}{b}\right) & for \quad |v_k|^2 < \dfrac{a^2}{1 + b^2} \end{cases}$$

wherein v_k is a given decision variable.